

ETABS Shear Wall Design

IS 456:2000 Pier Design

Pier Details

Story ID	Pier ID	Centroid X (mm)	Centroid Y (mm)	Length (mm)	Thickness (mm)	LLRF
3F	P14	0	12675	1550	200	0.894

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
24855.58	27.58	1	500	500

Design Code Parameters

Γ_s	Γ_c	IP_{MAX}	IP_{MIN}	P_{MAX}	MinEcc Major	MinEcc Minor
1.15	1.5	0.04	0.0025	0.8	Yes	Yes

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	0	11900	0	13450	1550	200
Bottom	Leg 1	0	11900	0	13450	1550	200

Flexural Design for P_u , M_{u2} and M_{u3}

Station Location	Required Rebar Area (mm ²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	P_u kN	M_{u2} kN-m	M_{u3} kN-m	Pier A_g mm ²
Top	2163	0.007	0.0013	DL+L.LL+EY ULS	87.3222	2.152	-584.8051	310000
Bottom	2583	0.0083	0.0013	DL+L.LL+EY ULS	428.9444	-13.2205	811.6422	310000

Shear Design

Station Location	ID	Rebar mm ² /m	Shear Combo	P_u kN	M_u kN-m	V_u kN	V_c kN	$V_c + V_s$ kN
Top	Leg 1	OS	DL+L.LL-EQY ULS	585.6775	491.4621	-871.9986	124.5403	348.2794
Bottom	Leg 1	OS	DL+L.LL-EQY ULS	459.9164	-813.0194	-888.6207	130.1285	353.8676

Number of legs where shear force exceeds max allowed (top, bottom) = 1, 1

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	P_u kN	M_u kN-m	Stress Comp MPa	Stress Limit MPa
Top-Left	Leg 1	200	DL+L.LL+EY ULS	131.5186	-481.4768	6.44	5.52
Top-Right	Leg 1	200	DL+L.LL+EY ULS	629.8739	594.7904	9.46	5.52
Bottom-Left	Leg 1	200	DL+L.LL-EQY ULS	467.444	-663.4135	9.79	5.52
Bottom-Right	Leg 1	200	DL+L.LL-EQY ULS	436.472	811.6422	11.54	5.52